

IN THE CLAIMS

The following is a complete listing of the claims, which replaces all previous versions and listings of the claims.

1. (Currently amended) A parent-bridge comprising; ~~comprised of~~:

a plurality of child-links ~~child-link~~ for receiving a plurality of transactions from a plurality of child-bridges, the child-bridges having a plurality of child-level transaction order queues and a plurality of grandchild-links for receiving the plurality of transactions from a plurality of buses;

a plurality of transaction identifier communication links ~~link~~ for receiving a plurality of transaction identifiers for identifying the plurality of transactions, wherein each of the plurality of transactions is associated with a respective grandchild-link of a child-bridge; and

a plurality of transaction order queue sets, the plurality of transaction order queue sets including a transaction order queue set for each respective child-link, each of the transaction order queue sets having a plurality of parent-level transaction order queues configured to receive a subset of the plurality of transactions, the subset including those transactions communicated over a particular ~~from the~~ child-link, wherein each of the plurality of transaction identifiers is uniquely ~~associated~~ associates a transaction of the subset with only one of the plurality of parent-level transaction order queues and ~~is associated with~~

one of the grandchild-links, and wherein the parent-bridge is configured to route the transaction of the subset to the associated parent-level transaction order queue based on the transaction identifier associated with the transaction, such that the plurality of parent-level transaction order queues and the plurality of transaction identifiers facilitate maintenance of transaction ordering from the plurality of child-bridges to and within the parent-bridge.

2. (Currently amended) The parent-bridge of claim 1, wherein the plurality of transaction identifier communication links comprise ~~link comprises~~ the ~~child-link~~ plurality of child-links.

3. (Currently amended) The parent-bridge of claim 1, further comprising a plurality of transaction buffers ~~buffer~~ associated with the ~~child-link~~ plurality of child-links.

4. (Currently amended) The parent-bridge of claim 3 ~~[[1]], further comprising a~~ wherein the plurality of transaction buffers includes multiple transaction buffers associated with the each of the plurality of child-links ~~child-link~~.

5. (Currently amended) The parent-bridge of claim 2, each of the plurality of child-links ~~child-link~~ further comprising:

a plurality of channels;

wherein at least one channel of the plurality of channels is used to receive the plurality of transaction identifiers.

6. (Currently amended) The parent-bridge of claim 1, wherein the plurality of parent-level transaction order queues and the plurality of transaction identifiers facilitate pure transaction ordering at the parent-bridge level.

~~the child-link further comprising:~~

~~a plurality of child-links; and~~

~~a plurality of transaction order queues associated with each of the plurality of child-links.~~

7. (Currently amended) The parent-bridge of claim 1, further comprising:

a routing mechanism for routing a transaction with a transaction identifier to a matching parent-level transaction order queue.

8. (Currently amended) The parent-bridge of claim 7, wherein each transaction order queue of the plurality of parent-level transaction order queues is associated with a transaction order queue identifier uniquely matching a transaction identifier of the plurality of transaction identifiers.

9. (Original) The parent-bridge of claim 7, wherein the routing mechanism routes a transaction with a transaction identifier without a matching transaction order queue to a default transaction order queue.

10. (Currently amended) The parent-bridge of claim 1, wherein each of the plurality of child-links ~~the child-link~~ is connected to a bus-bridge.

11. (Currently amended) The parent-bridge of claim 1, wherein each of the plurality of child-links ~~the child-link~~ is connected to a bridge-bridge.

12. (Currently amended) A child-bridge, comprising: ~~comprised of:~~

a plurality of grandchild-links for receiving a plurality of transactions from a first level of a computer hierarchy, the child-bridge configured to be located at a second level of the computer hierarchy;

a first plurality of transaction order queues for facilitating transaction ordering at the second level;

a child-link for sending the plurality of transactions received by the plurality of grandchild-links to a parent-bridge located at a third level of the computer hierarchy; and

a transaction identifier communication link for sending a plurality of transaction identifiers associated with the plurality of transactions sent on the child-link, wherein each of the plurality of transaction identifiers is originated within the child-bridge and is uniquely associated with only one the plurality of grandchild-links and only one of a second plurality of transaction order queues of the parent-bridge that receive the plurality of transactions from the child-link and are configured to facilitate transaction ordering at the third level, wherein the plurality of transaction identifiers enable transaction ordering to be maintained from the second level through the third level.

13. (Original) The child-bridge of claim 12, wherein the transaction identifier communication link comprises the child-link.

14. (Original) The child-bridge of claim 13, the child-link further comprising:
a plurality of channels;

wherein at least one channel is used to send the plurality of transaction identifiers.

15. (Currently amended) The child-bridge of claim 12, wherein the plurality of transaction identifiers enable pure transaction ordering to be maintained through the third level ~~at least one of the plurality of grandchild-links is associated with a transaction identifier of the plurality of transaction identifiers.~~

16. (Previously presented) The child-bridge of claim 12, wherein at least two of the plurality of grandchild-links are associated with at least two different transaction identifiers of the plurality of transaction identifiers.

17. (Canceled)

18. (Currently amended) The child-bridge of claim 12, wherein ~~the a~~ grandchild-link of the plurality of grandchild-links is connected to a bus.

19. (Currently amended) The child-bridge of claim 12, wherein ~~the a~~ grandchild-link of the plurality of grandchild-links is connected to a bus-bridge.

20. (Currently amended) The child-bridge of claim 12, wherein ~~the a~~
grandchild-link of the plurality of grandchild-links is connected to a bridge-bridge.

21. (Currently amended) A method of routing transactions with transaction
identifiers, the transactions received by a parent-bridge, the parent-bridge comprising a
child-link and a plurality of transaction order queues for the child-link, comprising the
steps of:

receiving a transaction on the child-link, the child-link coupled to a child-
bridge, wherein the transaction is associated with a respective grandchild-link of
the child-bridge and is ordered at the child-bridge level with respect to other
transactions received by the child-bridge;

receiving a transaction identifier for the transaction ~~link~~, wherein the
transaction identifier is indicative of the association of the transaction and the
respective grandchild-link;

matching the transaction identifier to a transaction order queue of the
plurality of transaction order queues for the child-link, wherein the transaction
identifier is uniquely associated with only one of the plurality of transaction order
queues such that the respective grandchild-link is uniquely associated with the one
of the plurality of transaction order queues via the transaction identifier; and

routing the transaction to the transaction order queue associated with the transaction identifier, wherein routing enables transaction ordering performed at the child-bridge level to be maintained at the parent-bridge level.

22. (Original) The method of claim 21, wherein the parent-bridge further comprises a transaction buffer for the child-link, further comprising the step of storing the transaction in the transaction buffer.

23. (Original) The method of claim 21, wherein the parent-bridge further comprises a plurality of transaction buffers for the child-link, further comprising the steps of:

matching the transaction identifier to a transaction buffer of the plurality of transaction buffers for the child link;

routing the transaction to the transaction buffer;

storing the transaction in the transaction buffer.

24. (Original) The method of claim 21, wherein the transaction identifier is received on the child-link.

25. (Canceled)

26. (Currently amended) A method of routing transactions, the transactions received by a child-bridge on a plurality of grandchild-links, the child-bridge connected to a parent-bridge, comprising the steps of:

receiving a transaction on a grandchild-link;

originating a transaction identifier, wherein the transaction identifier ~~is uniquely associated with~~ uniquely associates the grandchild-link ~~and with a single~~ transaction order queue of the parent-bridge such that a one-to-one correspondence between the grandchild-link and the single transaction order queue is established;

sending the transaction to the parent-bridge; and

sending the transaction identifier to the parent-bridge;

wherein the one-to-one correspondence between the grandchild-link and the single transaction order queue enables pure transaction ordering in the parent-bridge.

27. (Original) The method of claim 26, wherein the transaction identifier is sent to the parent-bridge on a child-link.

28. (Original) The method of claim 26, wherein the transaction identifier is determined by the grandchild-link on which the transaction was received.

29. (Canceled)

30. (Canceled)

31. (Currently amended) A computer system, comprising:

a plurality of processors;

a parent-bridge at a first level of the computer system, the parent-bridge comprising:

a child-link; and

a plurality of transaction order queues connected to the child-link; and

a child-bridge located at a second level of the computer system and connected via the child-link to the parent bridge, the child-bridge and further comprising a plurality of grandchild-links, grandchild-links configured for connection to a plurality of devices at a third level of the computer system;

wherein each of the plurality of grandchild-links ~~transaction order queues~~ is associated with ~~at least~~ only one of the plurality of transaction order queues ~~grandchild-~~

links to provide a one-to-one correspondence between each of the plurality of grandchild-links and a respective the plurality of transaction order queue to enable pure transaction ordering at the first level of transactions originating from the third level queues and the grandchild-links.

32. (Original) The computer system of claim 31, further comprising:

a plurality of child-links to a plurality of child-bridges.

33. (Original) The computer system of claim 31, wherein the child-bridge transmits a transaction and transaction identifier to the parent bridge.

34. (Original) The computer system of claim 33, wherein the transaction identifier is associated with a transaction order queue of the plurality of transaction order queues in the parent-bridge.

35. (Original) The method of claim 34, wherein the transaction identifier exclusively identifies a grandchild-link of the plurality of grandchild-links.

36. (Original) The computer system of claim 34, wherein the parent-bridge routes the transaction to the transaction order queue of the plurality of transaction order queues matching the transaction identifier.

37. (Original) The computer system of claim 31, further comprising a transaction buffer connected to the child-link.

38. (Original) The computer system of claim 31, further comprising a plurality of transaction buffers connected to the child-link.

39. (Currently amended) A computer system, comprising:

a plurality of buses at a first level of the computer system;

a plurality of child-bridges at a second level of the computer system, wherein each of the plurality of child-bridges is coupled to at least a respective one of the plurality of buses and is configured to receive transactions therefrom;

a parent-bridge at a third level of the computer system, the parent-bridge coupled to each of the plurality of child-bridges, wherein the parent-bridge comprises a plurality of transaction order queue sets, wherein the plurality of transaction order queue sets includes one transaction order queue set associated with each respective child-bridge of the plurality of child-bridges, ~~each of the transaction order queue sets corresponds to a~~

~~respective one of the plurality of child-bridges~~, and wherein each of the plurality of transaction order queue sets associated with the plurality of child-bridges comprises a plurality of transaction order queues, each of the buses of the plurality of buses being associated with only one of the transaction order queues ~~corresponding to at least one of the plurality of buses~~ such that there is a one-to-one correspondence between the buses of the first level and the transaction order queues of the third level, and such that an association between ~~the at least one~~ each of the plurality of buses and a transaction received therefrom ~~from the at least one of the plurality of buses~~ is maintained at both the second level and the third level of the computer system to facilitate pure transaction ordering within the third level ~~the parent-bridge~~.

40. (Currently amended) The parent-bridge of claim 1, wherein each of the plurality of transaction identifiers is uniquely associated with only one of the grandchild-links to enable pure transaction ordering within the parent-level.